

**PATENT**  
**06007/38331**

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Please cancel claims 16 and 17 without prejudice.

REMARKS

The claims have now been reviewed and amended to conform to U.S. practice, but have not been narrowed. The specification has been given headings and spellings corrected, and a substitute Abstract has been provided on a separate sheet. No new matter has been added.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

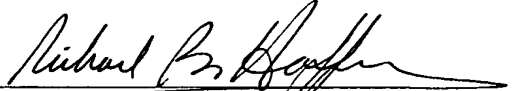
It is respectfully submitted the application as amended above is now in condition for substantive examination on the merits. If any claim or other fees are due by this Amendment, please charge our deposit account No. 13-2855.

**PATENT**  
**06007/38331**

Respectfully submitted,

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE****IN THE SPECIFICATION:**

At page 1, after the title, please delete Description of Invention and add a new centered heading as follows:

--Field of the Invention--

At page 1, please delete the entire first paragraph, and substitute with the following:

This invention relates to a hydraulic system for raising and lowering an aircraft landing gear". The invention is", and more particularly but not exclusively useful for a kind of aircraft landing gear known as a side brace, where the landing gear is movable between a generally vertical condition for landing, and a generally horizontal condition for stowage e.g. within a wing of the aircraft.

Page 1, after first full paragraph, please add a new centered heading as follows:

--Background of the Invention--

Page 1, after third full paragraph, please add a new centered heading as follows:

--Summary of the Invention--

At page 1, please delete the entire fourth paragraph, with carryover to page 2, and substitute with the following:

According to one aspect of the invention we provide a hydraulic system for raising and lowering aircraft landing gear, the system including an actuator which is extendible and retractable to operate the landing gear, the actuator including a movable member in a casing, the movable member being moved relative to the casing in a first direction to extend the actuator when fluid under pressure is supplied to a first side of the movable member "whilst" while fluid is exhausted from a second side of the movable member, and the movable member being moved in a second direction to retract the actuator when fluid under pressure

is supplied to the second side of the movable member "whilst" while fluid is exhausted from the first side of the movable member, and there being selector valve means selectively to supply "pressurised" pressurized fluid to the first or second side of the movable member, "characterised in that" and means "are" provided to permit exhausted fluid from at least one of the first and second sides of the movable member to augment the supplied fluid from the selector valve means and thus be directed with the supplied fluid, to the second or first side respectively of the movable member.

At page 3, please delete the third full paragraph, and substitute with the following:

The selector valve means may be movable to a first position to permit the flow of fluid therethrough from a source of "pressurised" pressurized fluid to the first side of the movable member, and to a second position to permit the flow of fluid therethrough from the source to the second side of the movable member, and to a rest position in which the source is isolated and fluid may pass from the system to tank.

At page 4, after second full paragraph, please insert a new centered heading as follows:

--Brief Description of the Drawings--

At page 5, after description of FIGURE 3, please insert a new centered heading as follows:

--Detailed Description of the Invention--

Page 5, please delete fourth full paragraph, and substitute with the following:

The landing gears 11, 12 are operable by means of respective actuators 18 which are extendible and retractable by means of "pressurised" pressurized hydraulic fluid.

Page 5, please delete sixth full paragraph, and substitute with the following:

When "pressurised" pressurized hydraulic fluid is supplied to a head end 11 of the actuator 18 at a first side of the piston 19, the piston 19 moves in the cylinder 20 so as to extend the actuator 18, at the same time forcing fluid at a second opposite side of the piston 19, to be exhausted from an actuator rod end 23 of the actuator 18. Conversely, when pressurized fluid is supplied to the actuator rod end 23 of the actuator 18, the piston 19 moves in the cylinder 20 so as to retract the actuator 18, at the same time forcing fluid to be exhausted from the head end 22.

Page 6, please delete the first full paragraph, and substitute with the following:

The selector valve means 25 is movable between three positions in this example. When in a first raised position, i.e. when a spool 29 thereof is in the position indicated in the drawings at I, "pressurised" pressurized fluid is supplied to a first supply line 30 which extends to the head end 22 of the actuator 18. In the first supply line 30 there is a flow regulating means 31 which controls the pressure of fluid which is supplied to the head end 22 of the actuator 18. Also there is a by-pass one way valve 32 which enables fluid from the first supply line 30 to flow freely to tank 27 as hereinafter described.

Page 6, please delete the second full paragraph, and substitute with the following:

When the spool 29 of the selector valve means 25 is in an intermediate or rest position as shown and indicated at R, the "pressurised" pressurized fluid source i.e. pump 26 is isolated from the actuator 18 and moreover fluid may flow from the first supply line 30 as well as from a second supply line 34 to be described, back to tank 27.

Page 6, please delete the third full paragraph, and substitute with the following:

When the spool 29 of the selector valve means 25 is in a second lowered position as indicated at II in figure 2, "pressurised" pressurized fluid is fed from the pump 26 to a second supply 34 which extends to the rod end 23 of the actuator 18. The second supply line 34

includes a one way valve 35 through which "pressurised" pressurized fluid may freely flow to the rod end 23 of the actuator 18, and a by-pass restrictor 36 which allows fluid to by-pass the one way vale 35 as hereinafter described.

Page 7, please delete the fifth full paragraph, and substitute with the following:

Typically, a mechanical or other sensing arrangement is provided which may interface with an interlock which operates mechanically to retain the landing gear in its fully lowered condition and may cause the selector valve means 25 to assume the rest position R once the landing gear 11 or 12 is fully lowered. In the rest condition R, fluid may flow from the first and second supply lines 30, 34 to tank 27 so that the system is "unpressurised" unpressurized when the landing gear 11 or 12 is in a fully lowered condition and the pump 26 is indicated.

Page 8, please delete the first full paragraph, and substitute with the following:

When it is desired to raise the landing gear 11 or 12 the selector valve means 25 may be moved to the second position II in which "pressurised" pressurized fluid is fed to the second supply line 34 through the one way valve 35 to the rod end 23 of the actuator 28, and the piston 19 will be moved to begin retraction of the landing gear 11 or 12. When there is an interlock mechanically to retain the landing gear in a lowered condition, this needs to be released before the piston 19 can move. Such release may be arranged to occur simultaneously with selector valve means 25 movement.

Page 8, please delete the third full paragraph, and substitute with the following:

As the landing gear 11 or 12 fully retracts, an uplock may be operated mechanically to hold the landing gear in its raised condition. At the same time, the selector valve means 25 may be moved to the rest position R so that again, the hydraulic system is "unpressurised" unpressurized when the landing gear 11 or 12 is in its stowed condition.

At page 10, please delete the last paragraph with carryover to page 11, and substitute with the following:

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination be "utilised" utilized for "realising" realizing the invention in diverse forms thereof.

**IN THE CLAIMS:**

Please delete Claims at top of page.

At line 1, before claim 1, please insert We Claim.

1 (Amended). A hydraulic system for raising and lowering aircraft landing gear, the system including an actuator which is extendible and retractable to operate the landing gear, the actuator including a movable member in a casing, the movable member being moved relative to the casing in a first direction to extend the actuator when fluid under pressure is supplied to a first side of the movable member [whilst] while fluid is exhausted from a second side of the movable member, and the movable member being moved in a second direction to retract the actuator when fluid under pressure is supplied to the second side of the movable member [whilst] while fluid is exhausted from the first side of the movable member, and there being a selector valve [means] selectively to supply [pressurised] pressurized fluid to the first or second side of the movable member, [characterised in that means are] and wherein a valve is provided to permit exhausted fluid from at least one of the first and second sides of the movable member to augment the supplied fluid from the selector valve [means] and thus be directed with the supplied fluid, to the second or first side respectively of the movable member.

2 (Amended). A system according to claim 1 [characterised in that the means which permit exhausted fluid to augment the supplied fluid includes a] wherein the valve is a check valve which is opened as the movable member of the actuator moves relatively in the casing in the first direction to extend the actuator and lower the landing gear.

3 (Amended). A system according to claim 2 [characterised in that] wherein the check valve opens to permit exhausted fluid from the second side of the movable member to augment the supplied fluid in response to one of the pressure of the fluid supplied to the first side of the member or [in response to] a pressure build up in a passage carrying exhausted fluid from the second side of the movable member.

4 (Amended). A system according to claim 2 [or claim 3 characterised in that] wherein a closure [means are] device is provided positively to close the check valve when pressurized fluid is supplied by the selector valve to the second side of the movable member.

5 (Amended). A system according to [any one of the preceding claims characterised in that means are] claim 1 wherein a relief device is provided to relieve exhausted fluid which is not recirculated from the at least one of the first and second sides of the movable member as the movable member reaches the end of travel in the casing.

6 (Amended). A hydraulic system according to [any one of the preceding claims] claim 1 including a first fluid supply line to the first side of the movable member for supplied fluid from the selector [means] valve when the selector valve [means] is in a first position, and a second supply line to the second side of the movable member for supplied fluid from the selector valve [means] when the selector valve [means] is in a second position, and the [means] relief device which permits exhausted fluid from at least one of the first and second sides of the movable member to augment the supplied fluid from the selector valve [means] and thus be directed with the supplied fluid, to the second or first side respectively of the



movable member, permitting the exhausted fluid to flow from the second supply line to the first supply line.

7 (Amended). A system according to claim 6 [characterised in that] wherein the second supply line includes a non return [means] valve at least to restrict the flow of exhausted fluid from the hydraulic system.

8 (Amended). A system according to claim 7 [characterised in that] wherein a restrictor [means] device is provided to enable a restricted flow of exhausted fluid which is not recirculated to by-pass the non-return [means] valve.

9 (Amended). A system according to [any one of the preceding claims characterised in that] claim 1 wherein the selector valve [means] is movable to a first position to permit the flow of fluid therethrough from a source of [pressurised] pressurized fluid to the first side of the movable member, and to a second position to permit the flow of fluid therethrough from the source to the second side of the movable member, and to a rest position in which the source is isolated and fluid may pass from the system to tank.

Please cancel claim 10 without prejudice.

11 (Amended). An aircraft having landing gear which is raised and lowered by a hydraulic system [according to any one of the preceding claims] including an actuator which is extendable and retractable to operate the landing gear, the actuator including a movable member in a casing, the movable member being moved relative to the casing in a first direction to extend the actuator when fluid under pressure is supplied to a first side of the movable member while fluid is exhausted from a second side of the movable member, and the movable member being moved in a second direction to retract the actuator when fluid under pressure is supplied to the second side of the movable member while fluid is exhausted from the first and second sides of the movable member to augment the supplied fluid from

the selector valve and thus be directed with the supplied fluid, to the second or first side respectively of the movable member.

12 (Amended). A valve including a valve member and a piston each received in a passage in a valve body, the valve member and piston being biased apart by [resilient means] a spring such that the valve member is urged towards a valve seat towards one end of the passage, and the piston is urged towards a stop towards an opposite end of the passage, a fluid inlet and a fluid outlet, the pressure of fluid at the inlet when sufficient, acting to move the valve member against the force of [the biasing means] a spring off the valve seat to permit fluid flow from the inlet, past the valve seat, to the outlet, and the piston being movable in the passage away from the stop in response to a pilot pressure delivered to a pilot pressure port of the body against the force of the [biasing means] spring to a position in the passage in which the piston engages the valve member and restrains the valve member against movement off the valve seat in response to the inlet pressure.

13 (Amended). A valve according to claim 12 [characterised in that means are] wherein a channel is provided to permit fluid pressure at the outlet to be communicated to an intermediate region of the passage between the valve member and the piston at least when the piston is engaged with the stop.

14 (Amended). A valve according to claim 13 [characterised in that] wherein the outlet opens into the valve passage and there is a flow path for the fluid under at the outlet past [and/]or through the valve member to the intermediate region when the valve member is in engagement with the valve seat.

15 (Amended). A valve according to [any one claims 13 to 14 characterised in hat] claim 12 wherein the valve is a check valve to permit the flow of exhausted fluid from at least one of the first and second sides of [the] a movable member of [the] an actuator of [the] a

hydraulic system [according to any one of claims 1 to 11] which includes an actuator which is extendible and retractable to operate landing gear of an aircraft, the actuator including a casing, the movable member being moved relative to the casing in a first direction to extend the actuator when fluid under pressure is supplied to a first side of the movable member while fluid is exhausted from a second side of the movable member, and the movable member being moved in a second direction to retract the actuator when fluid under pressure is supplied to the second side of the movable member while fluid is exhausted from the first side of the movable member, and there being a selector valve selectively to supply pressurized fluid to the first or second side of the movable be directed with the supplied fluid, to the second or first side respectively of the movable member to augment the supplied fluid from the selector valve [means] and thus be directed with the supplied fluid, to the second or first side respectively of the movable member.

Please cancel claims 16 and 17 without prejudice.